NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

A PROPOSAL FOR A COMPUTER-BASED SYSTEM
TO SUPPORT THE CHINESE MARINE CORPS
FIELD MANEUVER CONTROLLING AND
EVALUATION OPERATION (FIOP)

by

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June 1985

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This thesis uses IBM's Business Systems Planning (BSP) methodology to design a computer-based information system for the Chinese Marine Corps Field Maneuver Controlling And Evaluation Operation (FIOP).
It initially describes the current manual system by identifying each organizational group and the functions each perform. BSP is then defined including its background, underlying concepts and potential benefits. Finally, the BSP methodology (Continued)

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ABSTRACT (Continued)

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A Proposal For A Computer-Based System To Support The Chinese Marine Corps Field Maneuver Controlling And Evaluation Operation (FIOP)

by

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requirements for the degree of

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ABSTRACT

This thesis addresses IBM's Business Systems Planning (BSP) methodology to design a computer-based information system for the Chinese Marine Corps Field Maneuver Controlling And Evaluation Operation (FIOP).

It initially describes the current manual system by identifying each organizational group and the functions each perform. BSP is then defined including its background, underlying concepts and potential benefits. Finally, the BSP methodology is applied to FIOP resulting in a list of data classes, a process/data class matrix and an information flow diagram.

The conclusion is that a computer-based system for FIOP is both feasible and worthwhile. The recommendations are that a steering committee of major FIOP users be formed to devise obtainable and measurable objectives; that a BSP expert be hired to act as a consultant/coordinator for this project and finally, that the implementation plan be reviewed annually to ensure its continued cost effectiveness.

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A. PURPOSE OF THESIS

The purpose of this thesis is to establish an information system plan using IBM's Business Systems Planning (BSP) methodology to support the Chinese Marine Corps Field Maneuver Controlling And Evaluation Operation (FIOP). The purpose of FIOP is to generate a fighting ability evaluation report to tactical unit.

B. STATEMENT OF PROBLEM

There are two major problems with the current FIOP system.

1. Evaluation Reports Are Currently Received Too Late

In order to be effective, feedback to the field units and their commanding officers should be quick and easy-to-understand.

2. Evaluation Reports Are Currently Too Subjective

These reports are prepared by a team of senior officers who many times, as human beings do, interject their personal biases into their evaluations. Many commanding officers have criticized the current system because it is not objective and hence not fair to all the parties concerned [Ref. 1].

C. SCOPE AND LIMITATION

This thesis will restrict itself to the planning stage using the BSP methodology. This thesis is also limited to the "company" level which is the basic field maneuver unit.

II. CURRENT SYSTEM DESCRIPTION

A. PURPOSE

The Chinese Marine Corps Field Maneuver Controlling And Evaluation Operation has been designated by the Chinese Marine Corps as the primary controlling and evaluation instrument for the entire service. This thesis will be limited to the infantry company and subordinate level units. The purpose of FIOP is to:

1. Evaluate the ability of a tactical unit to perform specified missions under simulated combat conditions;
2. Evaluate the ability of the tactical units to perform maneuvers against one another;
3. Evaluate the effectiveness of the decision making of the company commanders and their subordinate leaders;
4. Provide a standard for controlling and evaluating maneuvers;
5. Provide an assessment of future training needs [Ref. 2].

B. ORGANIZATION AND FUNCTION

The "Field Maneuver Controlling And Evaluation Operation" is performed by the Controlling And Evaluation Department(CED). The CED is a temporary unit within the formal structure of the Chinese Marine Corps. The CED is always formed with individuals two levels above the unit being observed. For example if the unit being observed is a company the CED members should be recruited from the

regiment. the CED is made up of the following subgroups: The Central Processing Group, The Tactical Directing Group, The Fire Coordination Group, The Personnel Directing Group, The Communication Directing Group, and The Logistic Directing Group (see Figure 2.1) [Ref. 3] and [Ref. 4].

The functions of each group are described below.

1. The Controlling and Evaluation Department (CED)

The CED is organized two levels above the observed units. The functions of the CED are to:

a. Issue the maneuver plans, according to the fiscal year plan that certain units should be evaluated on certain subjects. The CED issues the maneuver plans to the maneuvering units and the subgroups of the CED;

b. Solve any problems that cannot be solved in the field by The Central Processing Group;

c. Supervise and control the entire operation;

d. Issue a performance evaluation report on the maneuver unit.

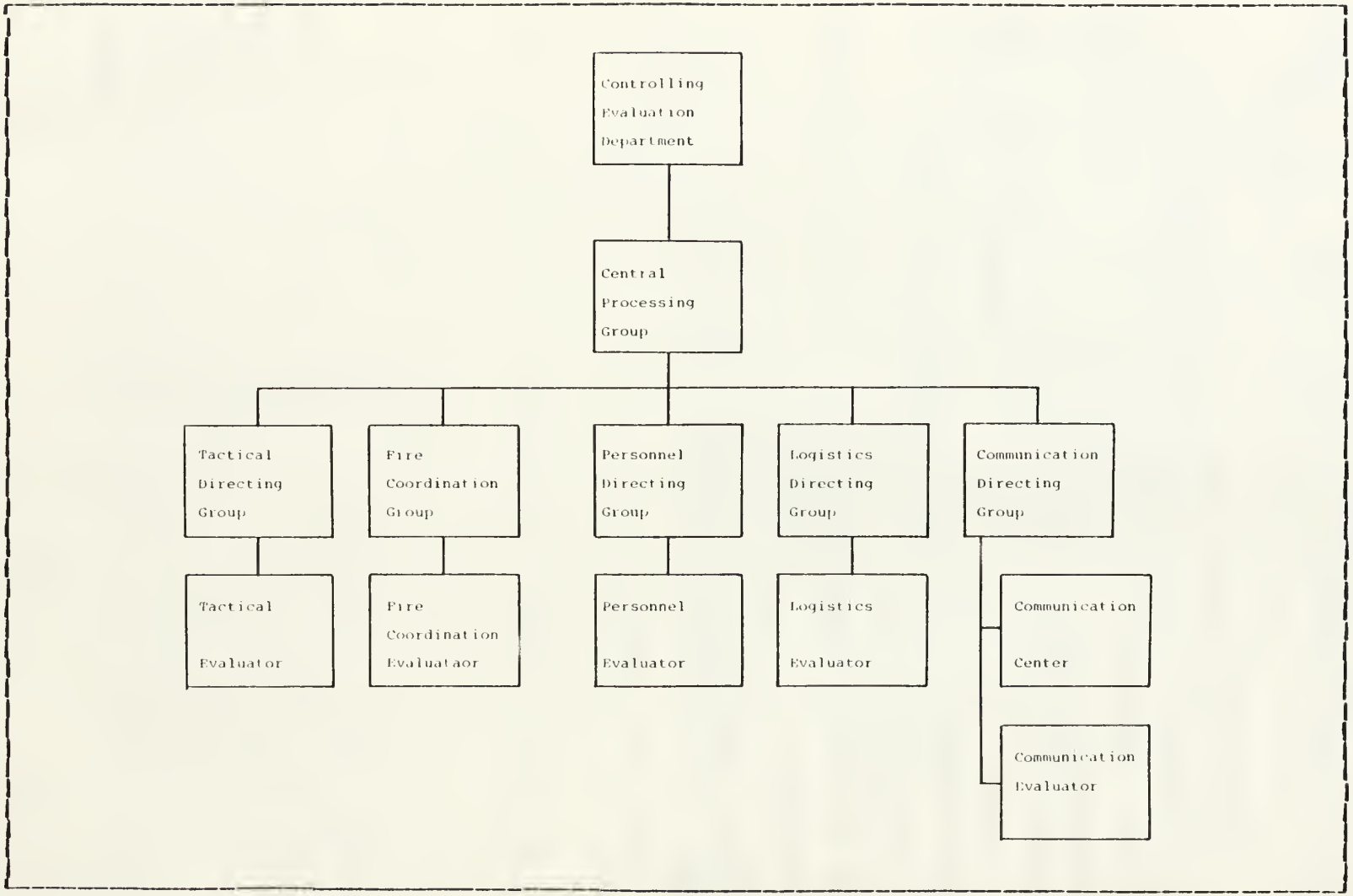

Figure 2.1 The CED Organization Chart.

2. The Central Processing Group

This group draws up the maneuver scheme, arranges the schedule and prepares a summary report of all the information collected from the subgroups during a maneuver. The functions of the Central Processing Group are to:

a. Store and analyze information during the maneuver;

b. Approve the maneuver plan which is submitted by the maneuver units;

c. Resolve any argument which cannot be resolved by the subgroups;

d. Supervise and control the operation of the subgroups;

e. Submit a performance evaluation report on the unit to the CED.

3. The Tactical Directing Group

This group is in charge of all the tactical operations of the maneuvering units. It's functions are to:

a. Decide the tasks of this maneuver;

b. Issue the Maneuver Directing Plan for the evaluating officers which includes several schemes for each possible tactical action. The tactical actions made by the commanding officer of the maneuver unit should closely match the schemes contained in the Maneuver Directing Plan;

c. Evaluate the tactical plan which is submitted by the maneuver units;

d. Control the position and the direction of the maneuver units;

e. Judge the damage after the two units meet under simulated combat situation;

f. Evaluate the selection of officers for specific tasks;

g. Receive and analyze the report from the evaluating officers;

h. Store and calculate information from the tactical evaluating officers;

i. Resolve any arguments which cannot be resolved by the evaluating officers;

j. Provide a performance evaluation report to the Central Processing Group and related groups.

4. The Fire Coordination Group

This group is in charge of the support weapons (e.g. Artillery and Tanks) used in the maneuver. It's functions are to:

a. Issue the support weapon application procedure;

b. Approve applications for support weapons during the maneuver;

c. Calculate the damage when there is firing (includes both maneuver units);

d. Remove troops and equipment from the maneuver units when hit (by simulated fire);

e. Evaluate the effectiveness of the firing according to the ammunition storage levels;

f. Provide the damage report and fire demonstration report to Central Processing Group and the related groups;

g. Select the evaluating officers.

5. The Personnel Directing Group

This group is in charge of the personnel information storage, update and personnel supply. It's functions are to:

a. Issue the perscnnel application procedure;

b. Determine the total number of personnel to take part in the maneuver;

c. Calculate the damage to personnel according to the report from The Tactical Directing Group and The Fire Demonstration Group;

d. Approve the personnel applications;

e. Update the information database after the application is approved;

f. Provide a performance evaluation report to The Central Processing Group and the related groups.

6. Communication Directing Group

This group is in charge of the control, supervision and evaluation of communication within the maneuver units. It's functions are tc:

a. Issue the maneuver communications procedures;

b. Establish the communication center in the CED;

c. Establish the evaluating officers communication channel;

d. Solve any communication problems;

e. Evaluate the communications procedures performed by the maneuver units;

f. Monitor the communications security;

g. Provide a performance report to the The Central Processing Group on communication;

h. Select the evaluating officers.

7. The Communication Center

This center is in charge of receiving and transmitting messages between the CED and the maneuver units(including the evaluating officers).

8. The Logistic Directing Group

This group is in charge of logistic operations which include Engineering, Medical operation, Transportation(vehicles), supplies(gas, ammunition,...etc.) and equipment. It's functions are to:

a. Issue the logistics operations procedures;

b. Calculate the damage to the logistics material when the units are hit;

c. Calculate the damage to the logistics material after two units were engaged;

d. Calculate the storage of ammunition, supplies, gas,...etc. after the maneuver;

e. Approve the application for logistics material from the maneuver unit;

f. Update the logistics information database after an application is approved;

g. Provide a performance report on logistics to The Central Processing Group and related groups.

9. The Evaluating Officers

The Evaluating Officers are sent by the Tactical Directing Group, the Fire Demonstration Group, the Communication Group, and the Logistic Directing Group. These evaluating officers perform their missions by following the maneuver units and making their reports on a standard form. There are four groups of evaluating officers as shown below.

a. The Tactical Evaluating Officer

The tactical evaluating officers are selected by the Tactical Directing Group. Their functions are to:

(a) Evaluate the tactical plan, operations, and decision making;

(b) Guide the maneuver units to follow the Maneuver Directing Plan under a simulated conditions instead of giving direct orders. This gives the commanding officer an opportunity to consider the situation and make a correct decision;

(c) Coordinate the evaluating officers of opposing units when two units meet;

(d) Coordinate the evaluating officers within a unit when conditions required such;

(e) execute orders from the CED;

(f) Resolve evaluating arguments within a unit;

(g) Make the tactical evaluation reports to the CED.

b. The Fire Coordination Evaluating Officer

Evaluates all the fire coordination operations, executes orders from the CED, makes the fire operation reports to the CED.

c. The Communication Evaluating Officer

Evaluates all the communications operation, monitors the communications discipline and makes the communication reports to the CED.

d. The Logistic Evaluating Officer

Evaluates all the logistics operations, controls the logistics material and makes the logistics reports to the CED.

III. INTRODUCTION OF BUSINESS SYSTEMS PLANNING

A. THE BACKGROUND OF BUSINESS SYSTEMS PLANNING

Business Systems Planning(BSP) is a structured approach to assist a business or an organization in establishing an information system to satisfy its near-and long-term information need. Such needs, of course, are not limited only to business but exist in all sectors; public and private; civilian and military. Information processing techniques that have been developed in one sector are usually easily transferred to another. Although the mission of one organizatien may differ from another, their objectives generally are the same: namely, to maximize the use of available resources while minimizing the costs to obtain them. Most of this information provided in this chapter has been extracted from [Ref. 5].

In the 1960s IBM was learning from its own mistakes and those of other companies that attempted to implement large information system and realized that a disciplined approach was required, using proven principles and methodologies. In 1966 a organization-wide Information System Control and Planning Department was established at IBM's Data Processing Group headquarters. The Data Processing Group was a total organization unit comprising the engineering, manufacturing, marketing, and service divisions responsible for all of IBM's domestic data processing business.

Until the control and planning department was established, IBM had little overall direction in the internal use of computers. In fact, little coordination took place between divisions; most data processing activities were confined to locations and units within divisions.

Consequently, each manufacturing plant and marketing region developed and operated its own system. Although the individual systems carried out similar functions, they differed in design and performance; they could not be used interchangeably and could not communicate with each other, so the systems were mainly satisfying local department needs, rather than doing an overall data processing job.

The first effort of the control and planning department was to inventory and profile the systems existing within the organizations and the plan for the future. At the same time, recognizing that the data processing effort must be directed toward satisfying organizational needs and not solely toward individual functions and departments, the control and planning department established a set of information system strategies covering five major areas:

1. Fixed data responsibilities
2. Single source and parallel distribution of data
3. Central control and planning of information systems
4. Organizational independence of data
5. Resource sharing of data, equipment, and communication

With the knowledge of what was being done with data processing, and the direction established through the set of strategies, the department defined an integrated set of information systems and assigned responsibilities for the development of the systems. These systems addressed the operational, functional, and general management needs for information.

As the definition and design efforts for this organization-wide set of information systems got under way in the late 1960s many of IBM's customers showed interest in learning how they might better manage their information

system resources. In an effort to assist these interested customers, IBM established the Business Systems Planning(BSP) program in 1970.

B. THE CONCEPTS OF BSP

1. Support the Goals and the Objectives of the Organization

This is the most basic concept which underlies the "top down" philosophy of the methodology as well as several of the specific steps, such as executive interviews and system priorities.

Since information systems can be an integral part of organizations and be critical to its overall effectiveness, and because they will continue to represent major investments of time and money, it is essential that they support the organization's true needs and directly influence its objectives.

It is important that an organization be willing and able to express its long-term goals and objectives. For some organizations, this can be done through the organization plan. For others, where a organization plan is not available or current, it can be done as a part of the BSP methodology. In either event, a recognition of this basic need by senior management is critical, for only with that recognition will their commitment and involvement be great enough to guarantee a meaningful BSP study.

2. Address the Needs of All Levels of Management

It is important to recognize the varying characteristics of information as needed by different activities and management levels. Lower levels need considerable detail, volume and frequency, higher levels need summaries, "exception" reporting, and inquires, and

still higher levels need cross-functional summaries, special requests, "what if" analyses, and "external" requirements.

The emphasis in information system should be in support of management decision making. Organizational decisions are made for various purposes, but most can be associated with either planning or control. Planning, of course, is the establishment of various mission, objectives, and policies, and it occurs at all levels; good information is essential to the establishment of good plans. Control decisions, by contrast, are made in order to guide the an activity toward some implicit or defined objective. The information system can provide the measurement of the current or actual condition to the decision maker. Since planning and control are the keys of decision making, a framework for information system based upon these activities can be used. It has been proposed and well accepted today, that three distinct but concurrent planning and control levels exist in most organization: Strategic Planning, Management Control, Operational Control, and an Information System could conveniently address itself to any one of the three planning and control levels.

3. Provide Consistency of Information

Traditionally, the data processing applications are not necessarily designed to be consistent among themselves and the data itself are converted from manual files located and maintained by various using organizations.

As computer applications are added, new data files are usually required since the data requirements for different applications are rarely the same. These are usually created from spinoffs of existing mechanized files plus any additional data that may be required from the using area. Data then, exists in most organizations in varying form, definition, and time. All of these factors can make

data becomes inconsistent. This becomes a problem most often during interdepartmental decision making or at higher reporting levels where consolidation of multifunction activities is important.

In order to begin to address the data consistency problem, a different philosophy must be adopted relative to data management. This is commonly referred to as managing data as a resource. This concept suggests that data is of considerable overall value to an organization and should be managed accordingly. It should be potentially available to and shared by the total business unit on a consistent basis. It should not be controlled by a limited organizational segment but by a central coordinator. The management function would include formulating policies and procedures for consistent definition, technical implementation, and security of the data.

4. Survive Organizational and Management Change

Many data processing systems and applications are set up to provide the information needs of a specific department or other organizational entity. Others are built solely on the specific output report requirements of a particular manager. Both types can become immediately obsolete upon a reorganization or management change. Different managers may have different ideas as to what information is needed to run the department. Although this kind of change is inevitable, it can be expensive from a data processing standpoint. The data processing system, however, should in no way inhibit management flexibility in a dynamic enterprise. Thus, the information system must be capable of evolving through the long term organizational and management changes of a business within minimum impact if the expected return on investment is to be realized.

5. Implement Project-By-Project for the Information Architecture

There are several implications associated with this concept. The first is that the a total information system to support the entire organization unit's needs is too big to build in any single project. However, because of these many problems associated with a "bottom up" evolution of system, it is very important that long-range goals and objectives for information systems(I/S) be established. The basic concept, then, is "top-down I/S planning with bottom-up implementation". (see Figure 3.1)

With this implementation strategy(the BSP approach), the information support is implemented in a modular building-block fashion over time, while remaining consistent with the organization's priorities, available funds, and other shorter-term considerations.

C. THE OBJECTIVES AND POTENTIAL BENEFITS OF BSP

1. Objectives

The basic objective of BSP is to provide an information system plan that supports the organizational short-and long-term information needs and is integral with the organization plan. There are several objectives that help to justify and clarify this approach:

a. Provide a formal, objective method for management to establish information system priorities without regard to provincial interests.

b. Provide for the development of systems that have a long life, protecting the systems investment, because the systems are based upon the organization process that are generally unaffected by organizational changes.

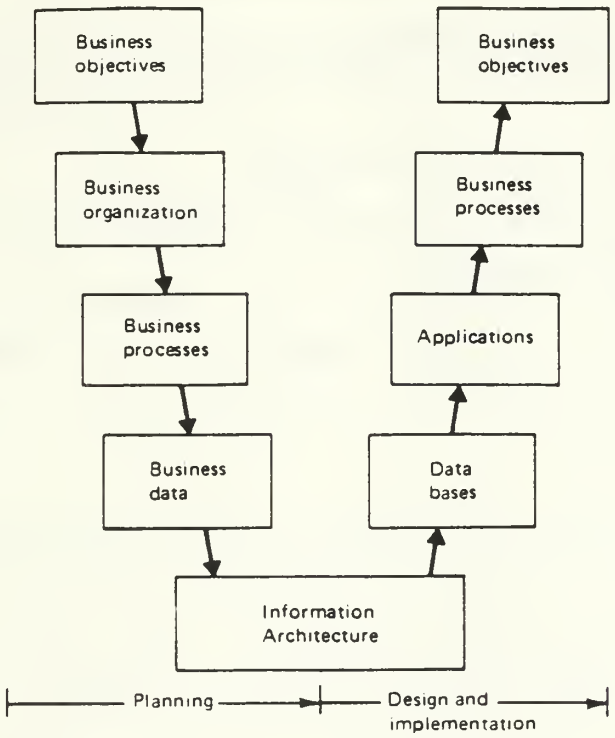

Figure 3.1 Top-Down Analysis with Bottom-Up Implementation.

c. Provide that the data processing resources are managed for the most the efficient and effective support of the organization goals.

d. Increase executive confidence that high-return, major information systems will be produced.

e. Improve relationships between the information department and users by providing for systems that are responsive to user requirements and priorities.

f. Identify data as a corporate resource that should be planned, managed, and controlled in order to be used effectively by everyone.

2. Potential Benefits

Application of the BSP approach and methodology will offers many potential benefits to three management groups:

a. To Executive Management

(a) An evaluation of the effectiveness of current information systems

(b) A defined, logical approach to add in solving management control problems from a organization perspective

(c) An assessment of future information systems needs based upon organization-related impacts and priorities

(d) A planned approach that will allow an early return on the organizational information systems investment

(e) Information systems that are relatively independent of organization structure

(f) Confidence that information system direction and adequate management attention exist to implement the proposed systems

b. To Functional and Operational Management

(a) A defined, lcgical approach to aid in solving management control problems

(b) Consistent data to be used and shared by all users

(c) Top management involvement to establish organizational objectives and direction, as well as agreed on system priorities

(d) A system that is management and user oriented rather than data processing oriented

c. To Information System Management

(a) Top management communication and awareness

(b) A better long-range planning base for data processing resources and funding

(c) Personnel better trained and more experienced in planning data processing to respond to business needs

(d) User involvement in information system priority setting

IV. DEFINING FIOP PROCESSES

A. WHY PROCESSES ARE DEFINED

The subject OPERATION here is FIOP "Field Maneuver Controlling And Evaluation Operation". The FIOP processes are defined as groups of logically related decisions and activities required to manage the resources of the operation. Defining the FIOP process is one step in the BSP methodology and the reason for defining the process is that doing so will provide or lead to:

1. An information system that is largely independent of organization changes
2. An understanding of how the operation accomplishes its overall missions and objectives
3. A basis for defining required information architecture, determining its scope, making it modular, and setting priorities for its development
4. A basis for defining key data requirements

The basic steps in defining processes are provided by Figure 4.1 [Ref. 5: p.29].

B. DESCRIPTION OF FIOP PROCESSES

There are seven major processes in FIOP. A description of these seven processes are produced below:

1. Management

This process involves managing all the CED's involved in a maneuver, coordinating, controlling and summarying the information into a final report. Included in this process are the activities of:

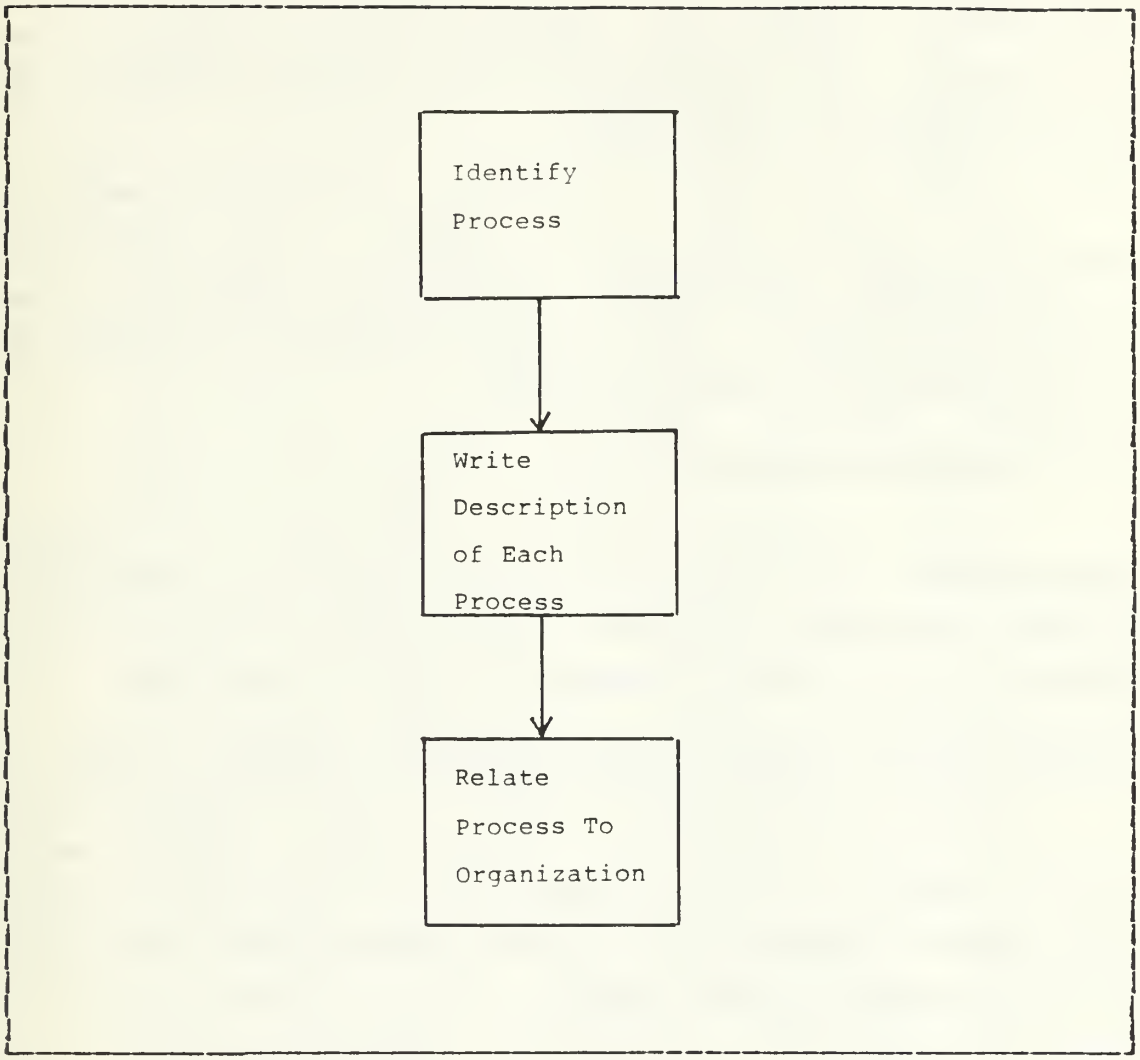

Figure 4.1 Definition Of Operation Process.

a. Organizing the controlling and evaluation department (CED)—the CED is organized by two levels above the maneuver units. When the upper unit receives a maneuver order they have to organize the CED with the necessary people to support the maneuver.

b. Developing the maneuver order--the CED has to develop the initial order with enough information (including when, where, and who will participate, and how to

acquire supplies..etc.) to maneuver units. With the initial order, the maneuver units can prepare for action. The more detailed plans will be issued by the Tactical Directing Group.

c. Managing evaluation information--after the maneuver is over, the CED has to approve the performance evaluation which shows the fighting ability of the maneuver units. This evaluation will be provided by the Central Processing Group.

2. Central Processing(C.P)

This process involves processing information received from the subgroups and resolveing any arguments. The initial evaluation report will also be generated in this process. The activities included in this process are:

a. Approving the tactical plan--the tactical plan is prepared by the maneuver units which includes how they are going to train their troops for the coming event, how they are going to perform this maneuver, and what kind of the supplies they will applly for. This plan is reviewed by the Tactical Directing Group.

b. Controlling and coordinating the arguments--unavoidably, arguments or problems will occur. These problems go to the Tactical Directing Group. If the argument is too complicated to be solved by this group, then a decision is made in the Central Processing Group.

c. Reviewing of evaluating information--the subgroups will provide the different informations concerning tactics, firing effectiveness, personnel, communication, logistics...etc. This information will be reviewed and the evaluation be made based on this information.

3. Tactics

This process involves monitoring all tactical behaviors; controlling the outcome of maneuvers and generating the tactical evaluation. The activities included in this process are:

a. Determining maneuver courses--the maneuver courses have to be determined in order to give the maneuver unit guidance to prepare for it. Usually, there are four major courses(Offense, Defense, Searching, Security Patrolling). More specific courses could be determined in this process.

b. Determining directing plan--this plan defines the scope and range of the maneuver. This plan will be issued to all the evaluators and the maneuver units. The maneuver units have to follow the instructions of the evaluators instead of performing the maneuver freely.

c. Reviewing tactical plans--according to the tactical directing plan the maneuver units should develop their own tactical plan to perform their mission. This plan will be reviewed, corrected, and submitted to the Central Processing Group.

d. Managing damage information--when two units make contact during a maneuver, the commanding officers will choose various tactical actions to destroy the enemy. After the deployment is done, the evaluator should decide which side won. The four evaluated factors of fighting ability are: PERSONNEL, TACTICAL ACTION, FIRING POWER, and TANGIBLE FIGHTING POWER (motivation, combat technics ...etc.), the two evaluators should provide a initial damage description

which includes the number of persons killed and the amount of equipment destroyed. This initial damage report is sent to the following groups: the Personnel Directing Group, the Fire Coordination Group, the Communication Directing Group and the Logistic Directing Group. This information is also included in the tactical evaluation report.

e. Selecting tactical evaluators--qualified tactical officers will be selected for this activity. These evaluators will follow the maneuver units physically to perform their tactical evaluation.

f. Managing tactic information--the information provided by the tactical evaluators is used to generate the tactical evaluation report. This report provides the Central Processing Group with information on how well the unit's commanding officer's know tactical operations.

4. Firing

This process involves collecting the firing information of the maneuver units (both unit and supporting fire). The activities included in this process are:

a. Managing supporting weapon resources--a standard procedure will be determined to provide supporting weapons. The maneuver units can acquire supporting weapons through a formal application.

b. Reviewing weapon applications--the weapon application will be reviewed in this activity. The decision of either approving or rejecting should be made based on the unit's compliance with the standard weapons application procedure.

c. Providing effectiveness evaluation information--this activity is similar to the damage report in the tactical process. The difference is the damage is caused by firing instead of tactical action. In this activity, the evaluation of the effectiveness of a firing should be made after the weapons have been fired. This information will also be sent to the following related groups: the Personnel Directing Group, the Communication Directing Group, the Logistic Directing Group.

d. Selecting fire coordination evaluators--qualified fire coordination officers will be selected in this activity. They will follow the maneuver units physically to perform their fire coordination evaluation.

e. Providing the fire utilization evaluation report--this evaluation report describes the degree the commanding officers understand the specifications of the supporting weapons, the degree he utilize those weapons and effectiveness of the firing. This evaluation report is sent to the Central Processing Group as a part of the final evaluation report.

5. Personnel

This process involves storing, computing, and updating all information about personnel. The activities included in this process are:

a. Managing personnel resources--a standard procedure for personnel management will be developed in this activity. The maneuver units can acquire personnel through a formal application when they have personnel losses during fighting.

b. Collecting damage information--after receiving the damage report about the tactical process and the firing process, the information about personnel should be computed and updated.

c. Selecting personnel evaluators--qualified personnel officers will be selected in this activity. The evaluators will follow the maneuver units physically to perform the personnel evaluation.

d. Providing personnel evaluation report--the information collected on personnel during the maneuver is sent to the Central processing Group as a part of the final evaluation report.

6. Communication

This process involves monitoring the communication discipline and guaranteeing the communication channels are in good condition at all times. The activities included in this process are:

a. Managing communication resources--a standard procedure should be developed for regulating communication discipline and applying for communication equipment. The maneuver units can acquire and use communication equipment through a formal application. This allows the evaluators to monitor the performance of the maneuver units.

b. Organizing the communication center--a communication center will be established in the CED in order to receive and transmit the information from and to the maneuver units.

c. Reviewing communication application--the application of communication equipment will be reviewed in this

activity. The decision of either approving or rejecting will be made based on the maneuver unit's adherence to the application procedure.

d. Selecting communication evaluators--qualified communication officers will be selected in this activity. They will follow the maneuver units physically to perform the communication evaluation.

e. Submitting the communication evaluation report--a communication evaluation will be developed in this process based on the communication discipline and current communication equipment condition of the maneuver units. This report will be sent to the Central Processing Group as a part of the final evaluation report.

7. Logistics

This process involves storing, computing, and updating all the information about logistics materials (e.g. vehicles, ammunition, gas,....etc). The activities included in this process are:

a. Managing logistics resources--in order to manage the logistic resources, a standard procedure should be developed for this activity. The maneuver units should acquire the logistic materials through a formal application when they have damage during the fighting or normal consumption during the maneuver.

b. Reviewing logistics application--the logistic material application will be reviewed in this activity. The decision of either approving or rejecting should be made based on adherence to the logistics application procedures.

c. Selecting logistic evaluators--qualified logistic officers will be selected in this activity. They will follow the maneuver units physically to perform the logistic evaluation.

d. Submitting the logistic evaluation report--a logistics evaluation should be based on the consumption, damage, and the current logistic material condition. This evaluation report will be sent to the Central Processing Group as a part of the final evaluation report.

C. RELATION OF FIOP PROCESSES TO THE ORGANIZATION

To relate the FIOP processes to the CED structure, a process/organization matrix is provided in Figure 4.1. Essentially, this is a graphic representation of one aspect of the management system of the CED because it illustrates who makes the decision in each of the process. The following symbols are used in Figure 4.1 to indicate the degree of involvement:

☒ Major responsibility and decision maker

☒ Major involvement in the process

☑ Some involvement in the process [Ref. 5: p.33].

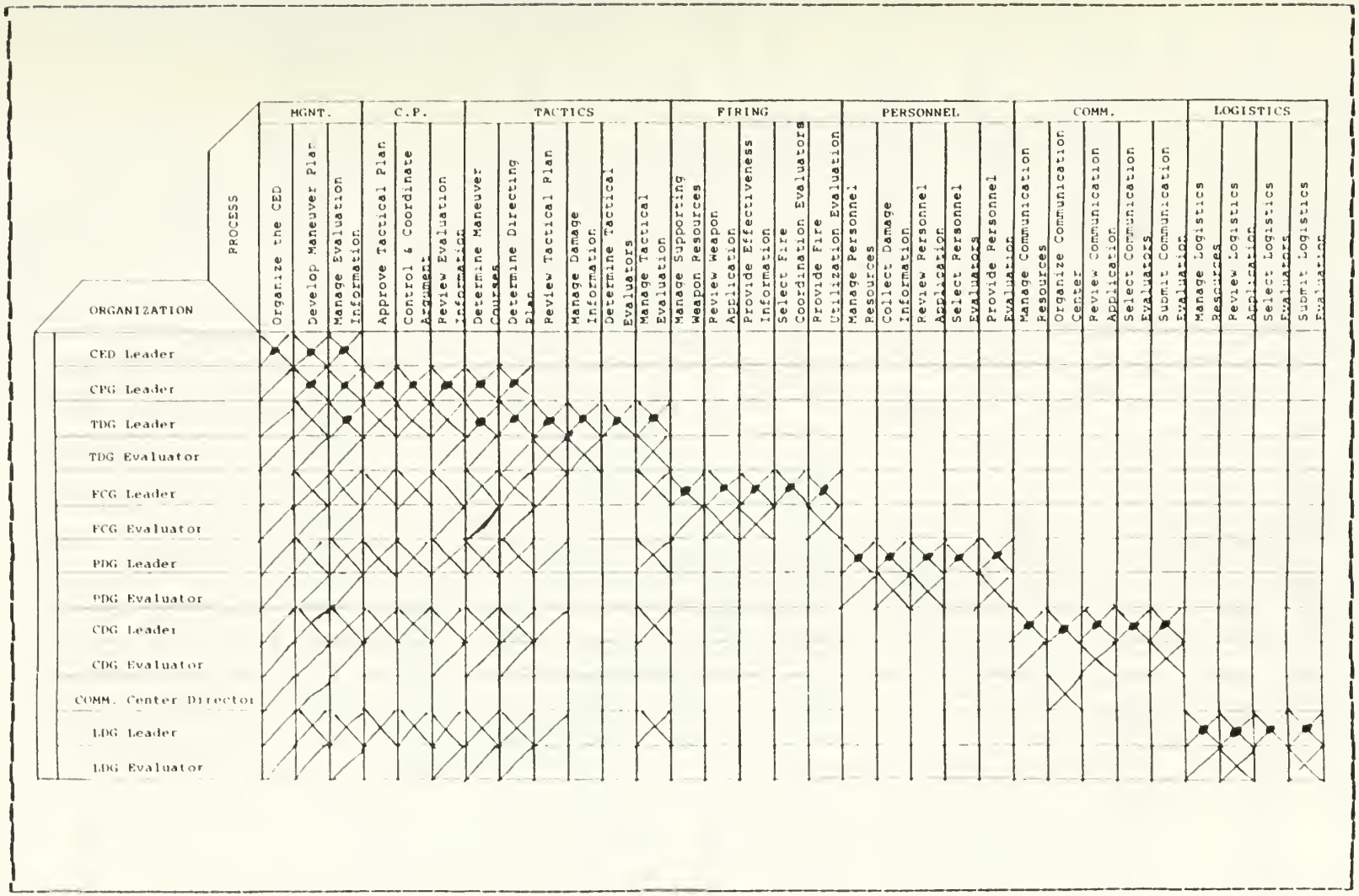

Figure 4.2 Process/Organization Matrix.

V. CONSTRUCTING FIOP INFORMATION FLOW

A. WHY INFORMATION FLOWS ARE IMPORTANT

The information architecture (processes/data class matrix, see Figure 5.5) is a very useful management communication tool because:

1. It is a recommendation for long-range information systems implementations.
2. It identifies the information systems (the boxes) that form the long-range plan.
3. It shows the data controlled by each information system (reading vertically).
4. It shows the operation processes supported by each information systems (reading horizontally).
5. It shows the flow of information between the various information systems (the lines and arrows) and thus shows the flow of information through the operation itself [Ref. 5: p.45].

B. DEFINE FIOP DATA CLASSES

The previous chapter identified the FIOP's processes. Once that is done, the next step is to define the FIOP's data classes and their relationship to each other.

A data class is a logical grouping of data related to the FIOP's processes that are significant to the CED. Such grouping permits a long-range information architecture to be identified. The data classes represent data that is available for FIOP's activities and decision making.

The objective of FIOP is to produce a final evaluation report. This report will be a consolidation and summary of many different reports from many different groups. For this reason, the data classes created here will be mostly with the format of "report". Data classes are defined in order to:

1. Determine data sharing requirements across processes.
2. Determine data that is necessary but either unavailable or insufficient for FIOP use.
3. Establish the groundwork for the formulation of a data policy (including data integrety responsibility) [Ref. 5: p.36].

To enable assignment of responsibility for data integrity, data classes are defined so that there is one and only one process that creates each datum.

Figure 5.1 illustrates how each FIOP data class was created. This involves listing each required datum on a table and then showing its progression through a process and finally what data class was created. The tool used to create the data class is the "data usage analysis sheet" provided by IBM's BSP methodology. Figure 5.2 (FIOP process/data class matrix) illustrates a compilation of all the FIOP processes and data classes generated from the analysis described in Figure 5.1. The detailed procedure for creating this matrix will be described in the next section.

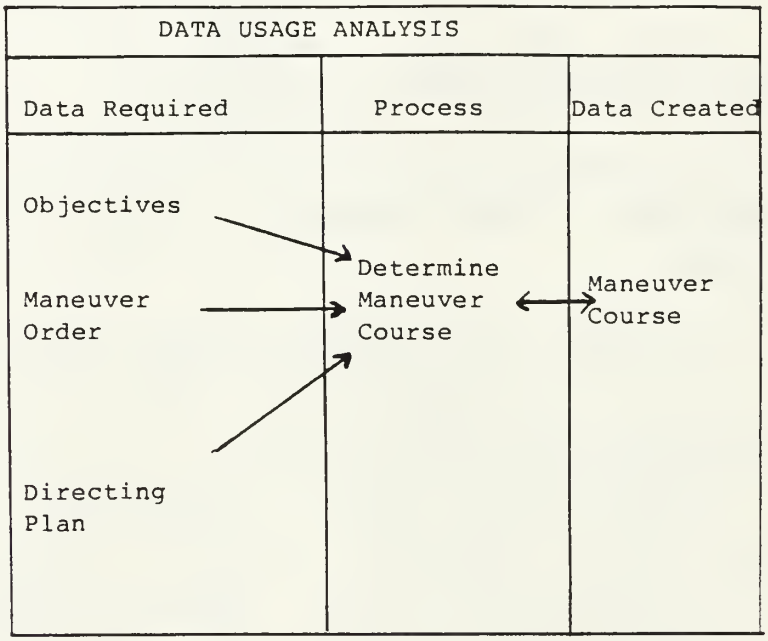

Figure 5.1 Sample Data Usage Analysis Sheets.

C. ESTABLISH FIOP PROCESS/DATA CLASS MATRIX

After the data classes have been identified, the relationship between data classes and operational processes must be established. To do sc is to ensure that:

1. All needed data classes and processes have been identified.

2. One and only one process creates each data class.

The tool used to establish the process/data class relationship is the information architecture or process/data class matrix(see Figure 5.2). The steps to create this matrix are as follow:

1. The processes are listed down the vertical axis. Begin with the processes of operational management and central processing; then tactical direction; and finally, list the processes for managing the supporting resources.

2. The data classes are listed across the horizontal axis. Begin with the first process and list the data classes "created" by this process (a "C" is placed at the intersection of the appropriate process row and data class column). Continue until all data classes are listed. There are 32 data classes in this matrix which is within the 30-60 data classes suggested by the formal methodology. The data classes are created by sequence and grouped by operational entity. For example, in Figure 5.2, the final evaluation report and other evaluation reports are not grouped together because of the creation sequence.

3. Across the row for each process, a "U" is placed in column for each data used by the process [Ref. 5: p.39].

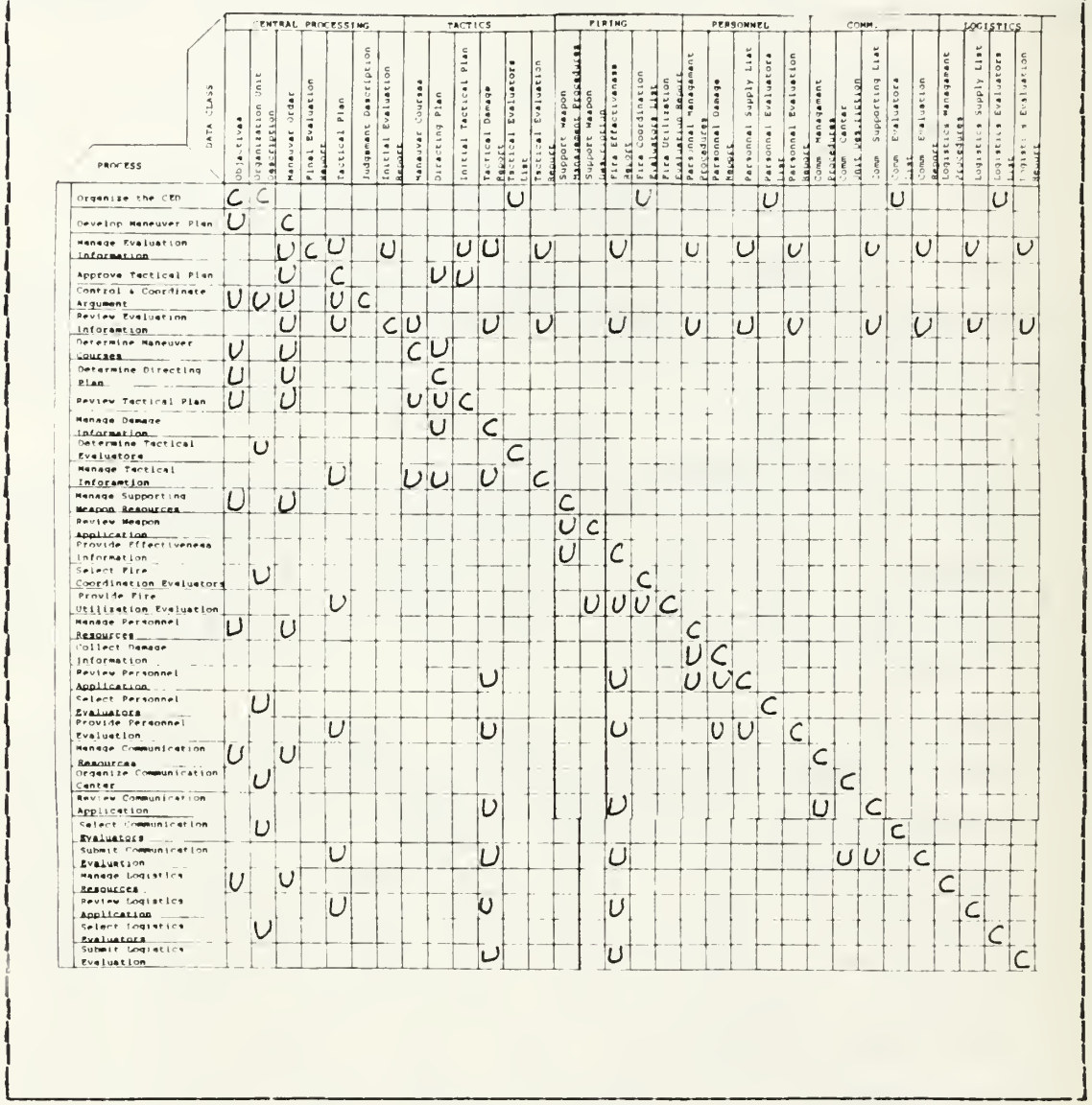

Figure 5.2 FIOP Process/Data Class Matrix.

The process/data class matrix becomes an important analytical tool for:

1. Verifying data class identification
2. Communicating data sharing concepts
3. Analyzing data problems
4. Determining dependencies between applications in the architecture [Ref. 5: p.39].

D. DEVELOP AN INFORMATION FLOW DIAGRAM

An information architecture flow diagram can be established by following steps:

1. Process Groups are Determined

Process groups are determined that have similar patterns of data usage. For each group, identify all the data classes created by the processes in that group. Figure 5.3 is the process grouping diagram for FIOP. The management group and the central processing group are combined together because they perform the similar functions. These two groups are merged becoming the central group. It should be noted in Figure 5.3 that different data classes are part of different process groups, controlled by different information systems, supporting different areas of the FIOP system.

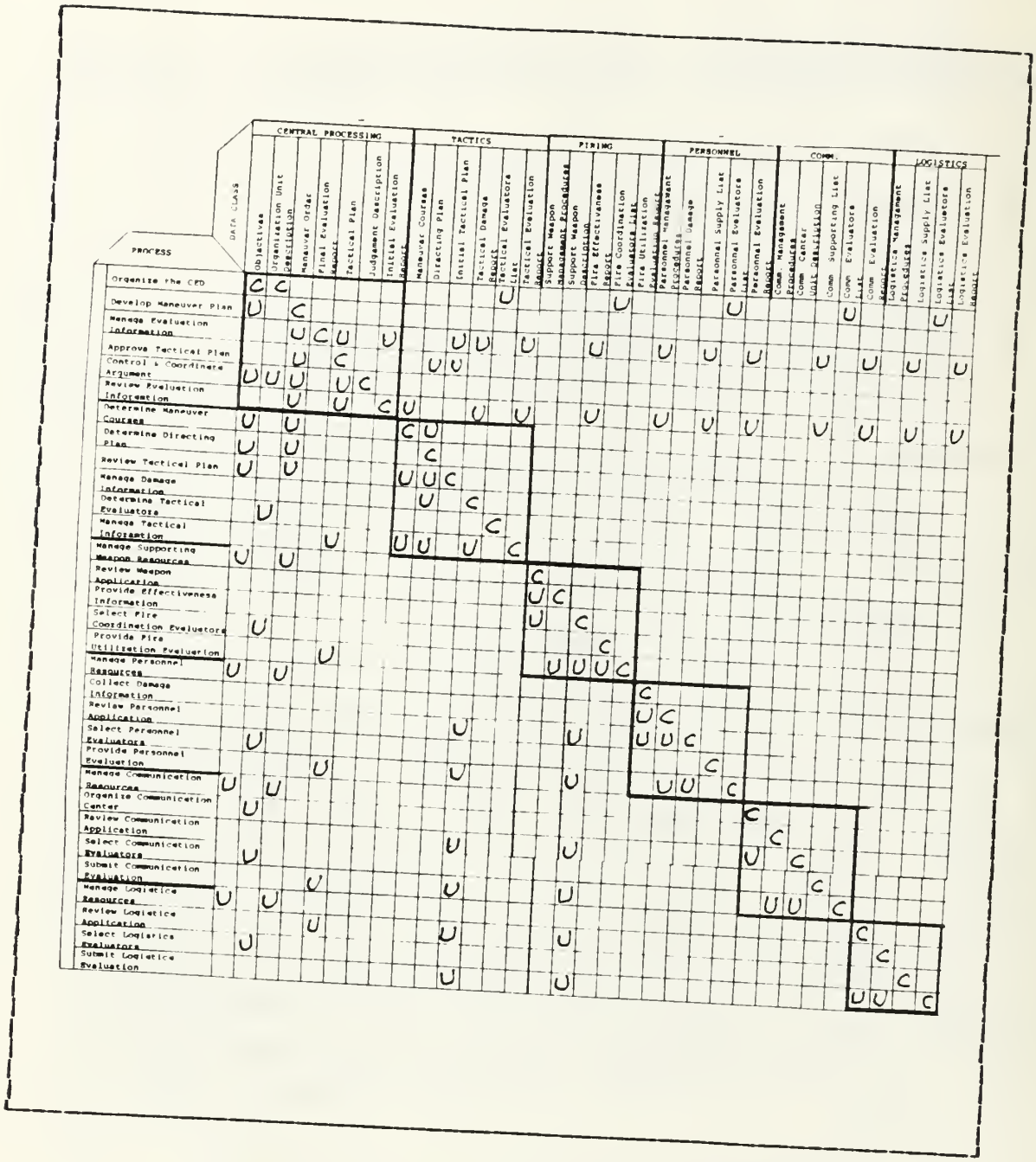

Figure 5.3 FIOP Process Groupings.

2. The Data Flow is Determined between Process Groups

Figure 5.4 is an entire data flow diagram. Whenever there is data used by a process and that data is created a process in some other group, an arrow is drawn from the creating group to the using group. For example, in the Figure 5.4, the data class "maneuver order" is used by the "determine directing plan process" but created by the "develop maneuver order process". This relationship needs an arrow which is drawn from the "central processing group" to the "tactics group". using the example above, all the U's data classes outside the group boundaries have an arrow drawn from the creating group to the boundary of the groups which use that data class.

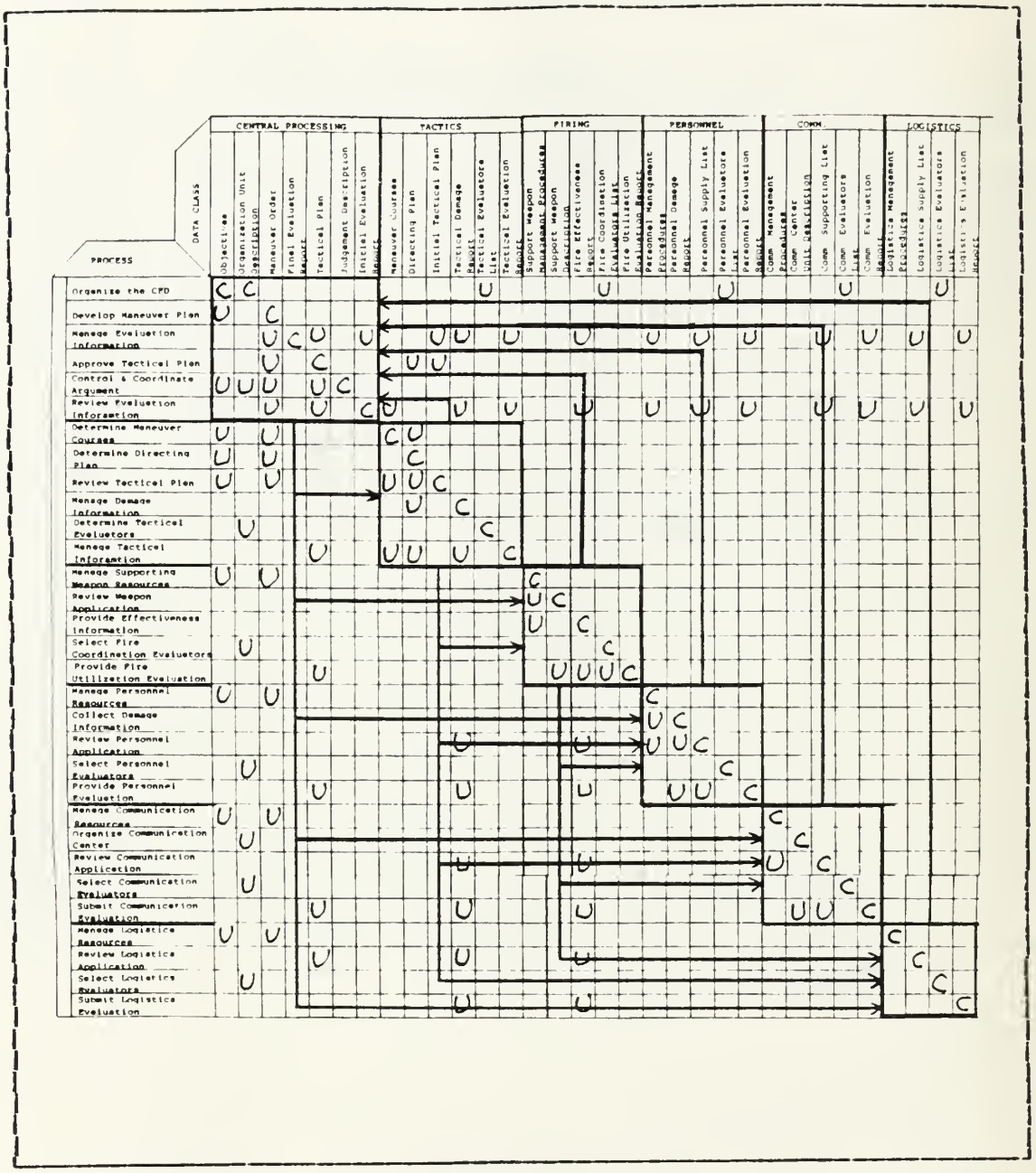

Figure 5.4 Data Flow Diagram.

3. Simplifying the Data Flow Graphic

For presentation purpose, this data flow diagram is simplified. The ways to do this simplification are to:

a. Remove the C's and U's.

b. Use two-way arrows.

c. Move the groups of processes and data classes to conform to the stylized information architecture [Ref. 5: p.45].

Figure 5.5 is a simplified version of the information architecture flow diagram presented in Figure 5.4.

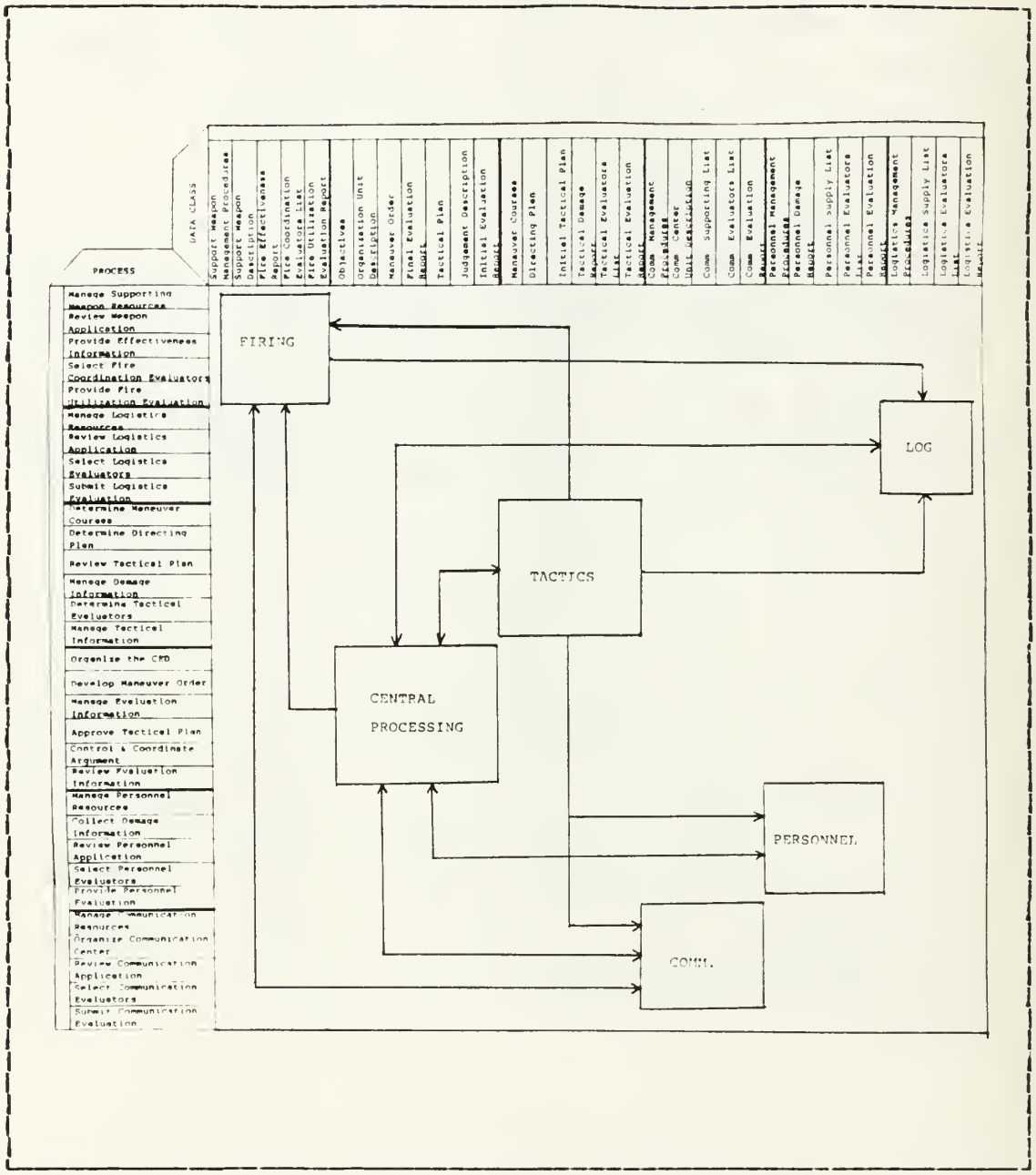

Figure 5.5 FIOP Information Architecture Flow Diagram.

VI. CONCLUSION AND RECOMMENDATIONS

This chapter presents the conclusions and recommendations of this thesis effort. It emphasizes that the IBM's BSP is a proper system planning methodology for FIOP to establish a computer-based information system.

A. CONCLUSION

If an information requirements study is intended to get the data issue out in the open and force an overt change in the design approach to information system, then BSP can be a most appropriate choice.

Every business or organization that continues to grow and evolve is likely to have to employ some form of enterprise analysis. BSP and BICS(Business Information Control Study) are important representatives of what is available today. [Ref. 6: pp51-52].

There are many studies that show the failure of an information system is due not only to a lack of managerial involvement but also to a lack of an improper implementation methodology in each development phase. To apply IBM's BSP to the Chinese Marine Corps FIOP is a new concept. Not only is there a possibility that BSP will be a standard in the system planning area, but, it also could be a guide or reference for both the CED group leaders and the designer in the development of a successful information system.

The FIOP is a vital part of the fighting ability training and education for the Chinese Marine Corps. The success of the computer-based information system will depend upon the use of an existing well defined BSP methodology, the effective involvement of the CED group leaders and the

knowledge of the FIOP information designer. The lack of any of these factors could have a definite impact on success.

B. RECOMMENDATIONS

IBM computer systems have already wide acceptance within the Chinese Armed Forces. While this provides an existing advantage for management to accept IBM's system development methodology, the adoption of any new methodology should be accomplished very carefully. There is no guarantee that a successful methodology applied in one country will also work in another country. What would be good for establishing a computer-based FIOP information system is that it would be a simple automation of a currently performed manual one. Thus, there would be no need to change the current Way of doing things. The following specific actions are recommended:

1. Establish a steering committee of major FIOP users. This committee represents the user groups of the FIOP. It's major concerns are to help the designer establish the direction of information use in the FIOP, and to ensure that the accomplishment of this information system will achieve the desired results. Namely that evaluation report will be produced on time and be more objective.

2. That a BSP expert be hired to act as a consultant/coordinator to help implement the planning factors delineated in this thesis. This will require considerable coordination between the chosen expert and the Chinese Marine corps to effectively modify the BSP, which is a business plan, to the military system.

3. That the implementation plan be evaluated annually to ensure continued cost effectiveness.

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